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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/631,067	08/01/2000	Hajime Kimura	SEL 201	6613

7590 03/17/2003

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EXAMINER
ZEADE, BERTRAND

ART UNIT	PAPER NUMBER
2875	

DATE MAILED: 03/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/631,067	KIMURA, HAJIME	
	Examiner	Art Unit	
	Bertrand Zeade	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,9* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Arguments

Applicant's request for reconsideration of the election of the last Office action is persuasive therefore, the election is withdrawn.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-4, 8-9 12-13, 20 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Beeson et al. (5,396,350).

Beeson ('350) discloses a backlighting apparatus employing an array of microprisms having:

Regarding claim 1, a light source (4); a light guide plate (6/90); and a plurality of prism-shaped lenses (see figs 7-8) each being contact with a lower surface of the light guide plate (6/90), wherein a cross-section of each of the prism-shaped lenses (see figs 7-8), in a plane perpendicular to the side surfaces thereof, has a shape of equally-sided trapezoid (see figs. 10-13); a plane defined by an upper base of the equally-sided trapezoidal cross-section (see figs. 10-13) of each of the prism-shaped lenses (see figs 7-8) comes into contact with the lower surface of the light guide plate; and an obtuse angle or tilted angle (col. 17, lines 42-48) of the equally-sided trapezoidal cross-section and a critical angle 8 for the total reflection of the prism-shaped lenses

(see figs 7-8) satisfy the relationship of 90° < ~ <_ 90° + 0 (see col. 8, lines 16-31 and figs. 3D, 6).

Regarding claim 3, a refractive index (col. 8, lines 16-31) of each of the prism-shaped lenses (see figs 7-8) is equal to that of the light guide plate (6/()).

Regarding claim 4, each of the prism-shaped lenses (see figs 7-8) is made of the same material as the light guide plate (6/90).

Regarding claim 8, a liquid crystal panel (12); and a front light (see figs. 1, 3D) for illuminating the liquid crystal panel (12), wherein the front light comprises: a light source (4); a light guide plate (6); and a plurality of prism- shaped lenses (28/80) each being contact with a lower surface of the light guide plate (6/90), wherein a cross-section of each of the prism-shaped lenses, in a plane perpendicular to the side surfaces thereof, has a shape of equally-sided trapezoid; a plane defined by an upper base of the equally-sided trapezoidal cross-section (see figs. 10-13) of each of the prism-shaped lenses comes into contact with the lower surface of the light guide plate; and an obtuse angle or tilted angle (col. 17, lines 42-48) of the equally-sided trapezoidal cross-section and a critical angle 8 for the total reflection of the light guide plate satisfy the relationship of 90° < ~ < 90° + 0 (see col.8, lines 16-31 and figs. 3D, 6).

Regarding claim 9, an optical sensor (see claims 1 and 13); and a front light (4) for illuminating an object to be read by the optical sensor (see claims 1 and 13), wherein the front light comprises: a light source (4); a light guide plate (6/90); and a plurality of prism-shaped lenses (28/80) each being in contact with a lower surface of the light guide plate (6/90), wherein a

cross-section of each of the prism-shaped lenses (28/80), in a plane perpendicular to the side surfaces thereof, has a shape of equally-sided trapezoid (see figs. 10-13); a plane defined by an upper base of the equally-sided trapezoidal cross-section of each of the prism-shaped lenses () comes into contact with the lower surface of the light guide plate; and an obtuse angle or tilted angle (col. 17, lines 42-48) of the equally-sided trapezoidal cross-section (see figs. 10-13) and a critical angle for the total reflection of the light guide plate the relationship of $90° < \sim <\_ 90° + 0$ (col. 8, lines 16-31 and figs. 3D).

Regarding claim 12, a refractive index of each of the prism-shaped lenses (28, 80) is equal to that of the light guide plate (6/90) and (col. 5, lines 43-68).

Regarding claim 13, each of the prism-shaped lenses (28, 80) is made of the same material as the light guide plate (6/90) and (col. 5, lines 43-68).

Regarding claim 20, a refractive index of each of the prism-shaped lenses 928/80) is equal to that of the light guide plate (6/90).

Regarding claim 23, each of the prism-shaped lenses is made of the same material as the light guide plate ((6/90).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2, 5-7, 10-11, 14-19, 21-22, 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman et al. (U.S.5,598,281) in view of Zimmerman et al.(5,555,109).

Zimmerman ('281) discloses a back light assembly for improved illumination employing tapered optical elements having:

Regarding claim 2, a light source (6); a light guide plate (70); and a plurality of prism-shaped lenses (40) each being in contact with a lower surface of the light guide plate (70), wherein a cross-section of each of the prism-shaped lenses (40), in a plane perpendicular to the side surfaces thereof, has a shape of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines; each of the prism-shaped lenses (40) is in contact with the light guide plate (70) in a plane including a shorter one in the pair of opposing parallel straight lines

(see figs. 7-10, 14); and in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point, is in the range of ±3° from a critical angle for the total reflection of each of the prism-shaped lenses (see figs. 6-9).

Regarding claim 5, a light source (6) a light guide plate (70); and a plurality of rotational-body lenses (40) each being in contact with a lower surface of the light guide plate (70), wherein each of the rotational-body lenses (40) has a shape of solid of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line; in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and a shorter one in the pair of opposing parallel straight lines to the certain point; and each of the rotational-body lenses is in contact with the light guide plate in a plane including the shorter one in the pair of opposing parallel straight lines. (See figs. 1-15B).

Regarding 6, a refractive index of each of the prism-shaped lenses (40) is equal to that of the light guide plate (70).

Regarding claim 7, each of the prism-shaped lenses (40) is made of the same material as the light guide plate (70).

Regarding claim 10, a liquid crystal panel (col. 1, lines 38-45); and a front light (6) for illuminating the liquid crystal panel from a display screen side thereof, wherein the front light comprises: a light source (6); a light guide plate (70); and a plurality of prism-shaped lenses (40) each being in contact with a lower surface of the light guide plate (70), wherein a cross-section of each of the prism-shaped lenses (see figs. 9, 13C-14C), in a plane perpendicular to the side surfaces thereof, has a shape of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines (see figs. 8C, 9< 13C-14C); each of the prism-shaped lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point.

Regarding claim 11, an optical sensor (see claim 1); and a front light (6) for illuminating an object to be read by the optical sensor, wherein the front light comprises: a light source (6); a light guide plate (70); and a plurality of prism-shaped lenses (40) each being in contact with a lower surface of the light guide plate (70), wherein a cross-section of each of the prism-shaped lenses (40), in a plane perpendicular to the side surfaces thereof, has a shape of an axially-symmetric figure that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle

points of the respective opposing parallel straight lines (see figs. 5C, 8C, 9, 13C-14C); each of the prism-shaped lenses (40) is in contact with the light guide plate (70) in a plane including a shorter one in the pair of opposing parallel straight lines; and in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point.

Regarding claim 14, a liquid crystal panel (col. 1, lines 38-45); and a front light (6) for illuminating the liquid crystal panel from a side of a display screen thereof, wherein the front light comprises: a light source (6); a light guide plate (70); and a plurality of rotational-body lenses each (40) being in contact with a lower surface of the light guide plate, wherein each of the rotational-body lenses (40) has a shape of solid of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line; each of the rotational-body lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point.

Regarding claim 15, an optical sensor (see claim 1); and a front light (6) for illuminating an object to be read by the optical sensor, wherein the front light comprises: a light source(6) ; a light guide plate (70); and a plurality of rotational-body lenses (40) each being in contact with a lower surface of the light guide plate (70), wherein each of the rotational-body lenses (40) has a shape of solid of revolution obtained by rotating an axially-symmetric figure, that is enclosed with a pair of opposing parallel straight lines and a pair of opposing curved lines and is axially symmetric with respect to a straight line connecting middle points of the respective opposing parallel straight lines, around said straight line; each of the rotational-body lenses is in contact with the light guide plate in a plane including a shorter one in the pair of opposing parallel straight lines; and in the axially-symmetric figure, an angle defined between a normal at a certain point on one of the opposing curved lines and a straight line connecting a crossing point between the other opposing curved line and the shorter one in the pair of opposing parallel straight lines to the certain point.

Regarding claim 16, a refractive index of each of the rotational-body lenses (40) is equal to that of the light guide plate (70).

Regarding claim 17, each of the rotational-body lenses (40) is made of the same material as the light guide plate (70).

Regarding claim 18, a refractive index of each of the prism-shaped lens (28) is equal to that of the light guide plate (6/90) and (col. 5, lines 43-68).

Regarding claim 19, each of the prism-shaped lenses (40) is made of the same material as the light guide plate (70).

Regarding claim 21, a refractive index of each of the prism-shaped lenses (40) is equal to that of the light guide plate (70).

Regarding claim 22, a refractive index of each of the prism-shaped lenses (40) is equal to that of the light guide plate (70).

Regarding claim 24, each of the prism-shaped lenses (40) is made of the same material as the light guide plate (70).

Regarding claim 25, each of the prism-shaped lenses (40) is made of the same material as the light guide plate (70).

Regarding claim 26, a refractive index of each of the rotational-body lenses (40) is equal to that of the light guide plate (70).

Regarding claim 27, each of the rotational-body lenses (4-0) is made of the same material as the light guide plate (70).

Zimmerman ('281) does not disclose a range of -3 from a critical angle for the total reflection of each of the prism-shaped lenses.

Zimmerman ('109) discloses an illumination system employing an array of microprisms having:

Regarding claims 2, 5, 10, 11, 14, 15, a range of -3 from a critical angle for the total reflection of each of the prism-shaped lenses (col. 5, lines 48-55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the back light assembly for improved illumination employing tapered optical

elements of Zimmerman ('281) with the range of ±3° from a critical angle for the total reflection of each of the prism-shaped lenses disclosed by Zimmernan ('109) for the benefit and advantage to provide an illumination system having sidewalls angled in such a way that light traveling through the waveguide is captured and directed by the microprism, reflects through the microprism via TIR and emerges from the microprism as a spatially directed light source, because a spatially directed light source is meant to include a substantially collimated light source in a direction substantially perpendicular to the light output surface or a light source directed at an angle with respect to the normal of the light output surface.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bertrand Zeade whose telephone number is 703-308-6084. The examiner can normally be reached on Monday-Friday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea, can be reached on (703) 305-4939. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Examiner: Bertrand Zeade

February 20, 2003.

Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800